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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/554,593	10/26/2005	Masaki Hirakata	125746	6661
25944	7590	11/15/2007		
OLIFF & BERRIDGE, PLC P.O. BOX 320850 ALEXANDRIA, VA 22320-4850			EXAMINER MILLER, DANIEL H	
			ART UNIT 1794	PAPER NUMBER
			MAIL DATE 11/15/2007	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

**Office Action Summary**

Application No.

10/554,593

Applicant(s)

HIRAKATA ET AL.

Examiner

Daniel Miller

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 04 September 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-56 is/are pending in the application.
- 4a) Of the above claim(s) 20-56 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-19 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Election/Restrictions***

The traversal is on the grounds that there is no undue burden in examining both the group I and group II claims. Applicants further argue that the groups of claims are not so unrelated as would require a burden beyond that of the normal burdens of examination. This argument has been considered, but not found persuasive. MPEP § 808.02 recites that for the purposes of the initial requirement of a restriction, a serious burden on the examiner may be prima facie shown if the examiner shows by appropriate explanation either separate classification, separate status in the art, or a different field of search as defined in MPEP § 808.02. Since the Examiner has shown a different classification for the two groups of claims, a burden for examining both groups has been shown. The requirement is still deemed proper and is therefore made FINAL.

### ***Claim Objections***

1. Claim1 is objected to because of the following informalities: applicant uses the term "characterized". The term "wherein" would be in conformity with US practice. Appropriate correction is required.

***Claim Rejections - 35 USC § 112***

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claim 1 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The applicant claims the carrier is transported "in accordance" with a voltage applied to the electrode. It is not clear how something is done "in accordance" with a voltage. It could be mean simultaneously with the voltage, because of the voltage, or something else entirely. Correction required.

3. Claims 5 and 6 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. It is unclear as to what "mainly" single or double walled carbon nanotubes means. It is unclear as to what is encompassed by the phrase, for example, if it means greater than 50%, or a majority even if less than 50%, or something else. Clarification required.

***Claim Rejections - 35 USC § 103***

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1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. Claims 1-19 are rejected under 35 U.S.C. 103(b) as being unpatentable over Tsukamoto (US 7,282,742) in view of Lavin (U.S. 6,426,134B1).

Tsukamoto teaches a field effect transistor having a gate a source and a drain electrode (see background and column 8 line 15-40) wherein the nanotubes form a semi-conducting material ("transporter layer", see examples).

The nanotube layer comprises a transporter layer of nanotubes.

However, Tsukamoto is silent as to cross-linking sites formed from the carbon nanotubes.

2. Regarding claim 1, Lavin teaches nanotubes with unique electrical and mechanical properties (column 1 line 50-60). Lavin further teaches nanotubes (treated with acid) with one or more carboxylic acid groups (or amine linkages) (column 5 line 47-55; column 3 line 60-65). The nanotubes can be copolymerized (cross-linked) with precursor polymers and then formed into a chip (a coating that acts as an electrical contact) and bonded to a plug (base body) (column 6 line 6-10).

3. It would have been obvious to a person of ordinary skill in the art to form a nanostructure for use in Tsukamoto using the structure of Lavin because the crosslinking of the nanotubes inherently forms a unified and stronger structure, that is

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superior to alternative weaker molecular forces (i.e. Van der Waal forces) that can bond nanotubes together. Therefore, it would have been obvious to use the structure of Lavin to crosslink the nanotubes and inherently form a unified and stronger structure, that is superior to alternative weaker molecular forces (i.e. Van der Waal forces) that can bond nanotubes together.

4. The material of Tsukamoto is considered to act as a "carrier" with voltage applied and a "transporter layer" to the extent to which applicant has defined those terms.
5. Regarding claims 2-4, Given the disclosure of Tsukamoto the electrical configurations claimed by applicant are well known in the art and would be obvious uses and/or configurations to one of ordinary skill in the art.
6. Regarding claim 9, The nanotubes are obtained by curing a solution (see example 1 column 6 line 38-68, column 7 line 1-45 Lavin).
7. Regarding claims 10-14, the cross linking agent is polyamide or polyimide which is not self-polymerizable (column 2 line 62-68 Lavin).
8. Regarding claim 7, the polymers used would inherently form one of the structures of claim 7 because they are the same polymer cross-linking agents as applicants.
9. Regarding claim 15-16, the nanotubes would inherently be bonded and the reaction that linked the nanotubes would inherently be one of the types of reaction enumerated by applicant.
10. Regarding claims 7 and 8 and 12, the nanotubes can have amine or carboxyl functional groups depending on the treatment, as stated above. Therefore, multiple

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functional groups are inherently bonded together to form cross-linking and the linking site would inherently be COO, COOH, or NH, or NHCOO.

11. Regarding claims 17-19, the carbon nanotubes structure of Tsukamoto are patterned to form "transporting layers", the substrate is considered to be inherently "flexible" to some degree (see silicon substrate (110) column 5 line 25-30), and the nanotubes are integrated on the substrate (see figures).

12. Regarding claim 5 and 6, it would be obvious to use either single walled or multi walled nanotubes, as taught by Tsukamoto (column 10 line 57-62), since both are inherently capable of forming functional groups and polymerizing and both have similar electrical properties.

13. Regarding claims 9-14, it should be noted that, "even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim (or limitation) is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process.", (In re Thorpe, 227 USPQ 964,966).

Once the Examiner provides a rationale tending to show that the claimed product appears to be the same or similar to that of the prior art, although produced by a different process, the burden shifts to applicant to come forward with evidence establishing an unobvious difference between the claimed product and the prior art product (In re Marosi, 710 F.2d 798, 802, 218 USPQ 289, 292 (Fed. Cir. 1983), MPEP 2113). Therefore, differentiations in the process are not pertinent to patentability.

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Therefore, the examiner need only show the claimed cross-linking agents were or are taught, not that the article was subject to "curing" a solution of carbon nanotubes, as claimed by applicant.

### ***Response to Arguments***

14. Applicant's arguments with respect to claims 1-19 have been considered but are moot in view of the new ground(s) of rejection.

### ***Conclusion***

15. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

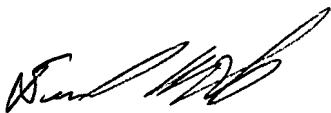
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the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

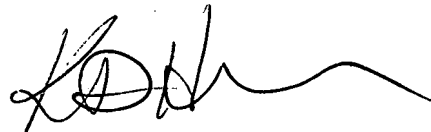
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Daniel Miller whose telephone number is (571)272-1534. The examiner can normally be reached on M-FTh.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Keith Hendricks can be reached on (571)272-1401. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Daniel Miller



KEITH D. HENDRICKS  
SUPERVISORY PATENT EXAMINER